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UTCS ComputerNews

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Woodpecker Destroys Civilization

Weinberg's Law:

If builders built buildings the way programmers write programs, then the first woodpecker that came along would destroy civilization.

Recently a user came to the Advising Office with a FORTRAN program that was producing error messages during execution. The program was written by a University researcher who had been using it without change for some time. When he contacted the Advising Office, he knew that a new release of the VS FORTRAN compiler had recently been installed and thought that it was the cause of his problems.

To resolve this problem, the list of known incompatibilities, which had been researched by UTCS and released to our users prior to the install of the new compiler, was gone over. Unfortunately the symptoms could not be matched.

Finally the Advisor trying to assist this researcher began to examine the FORTRAN program in detail. In no time at all a fairly straightforward coding error was found. Like many FORTRAN programs written here, this one was calling up a packaged subroutine such as those found in the IMSL or NAg libraries. A number of parameters were required, including a last parameter designated as a "work area." This last parameter, quite common in packaged subroutines, is a memory area given by the caller to the subroutine for use as its scratch pad area. Unfortunately, this last parameter was not coded.

Now you might wonder, how could this program have ever worked? Wouldn't it have produced an error message earlier? The answer is that FORTRAN itself does not detect this error, just as it does not detect many other kinds of errors. The miscoded program never provides a "work area" parameter, but the called subroutine does not know that. It goes to the part of memory where it expects to find this parameter and uses what it finds. The result is like playing roulette. If the user is lucky, the piece of memory that is taken to be a valid "work area" happens to be essential to the continued running of the program, which then comes to a crashing halt with some obscure "ABEND code" or "error message." Frequently the user is not so lucky however, and the memory written over alters the values of valid variables in the program. In that case there may be no error message, but any output from the program is highly suspect.

The researcher in this case was very fortunate that the upgrade in FORTRAN compiler happened to move the position of things in memory in such a way that his program crashed when the bogus "work area" was written onto.

Now this would be just an interesting anecdote, were it not that we see many such "undetected bugs" in the course of a year. Sometimes the program has been used by a number of researchers for some time. Who knows how much research is led astray this way? Who knows how many important discoveries have not been made?

How can you avoid "undetected bugs" in the programs you write? Here are some suggestions:

1. Debug your programs thoroughly. Just because your program ran without producing an error message doesn't mean its output is what you intended. Feed your program some test data for which you know the correct output. Your test data should be designed to trigger as many logic paths as possible. Pay particular attention to boundary conditions in your problem.
2. If your program is complicated, put WRITE statements at strategic places so you can verify the intermediary calculations on your test data.

continued...

Woodpecker Destroys Civilization continued

3. Write your programs in small pieces of no more that 100 lines each. Debug pieces separately by providing dummy subroutines for parts not written yet.
4. Use the structured language statements available with FORTRAN77. Avoid the nonstructured ones, such as GOTO.
5. Read the vendor documentation for any library subroutines you invoke. Double check that you are providing all required parameters and that each parameter you provide is the correct data type. (For example, if you are using NAg, all real variables must be double precision.) If you don't understand the vendor documentation, make an appointment with a UTCS consultant to go over it with you.
6. Check agreement of number and type of parameters between all subroutines you coded and their corresponding CALLS.
7. Use the tools provided by VS FORTRAN to hunt down problems. DEBUG SUBCHK can be used to detect bogus references to arrays and variables. TESTFORT used interactively can be used to locate many other kinds of errors.

The American Space Shuttle Mission computers use FORTRAN as a key language; you can just imagine the consequences of errors in the code of those programs! Defensive programming techniques help keep "bugs" out of the space program, and they can do the same for your program. The woodpeckers will just have to go back to the trees for bugs.

Alex Nishri

Documentation Update

Last month's publication of the UTCS Catalogue: IBM MVS Utilities was a significant step in the updating of UTCS documentation. Not only did it correct and expand the old USERBOOK 3.4 modules; it also brought about two changes in the publication policy for Catalogues.

1. Up to now, all Catalogues have been available only in hardcopy through the UTCS Information Office. This was originally decided because the Catalogues are intended to be introductory documents, which must be readily available to novice users. All Catalogues will continue to be sold through the Information Office, but whenever possible, they will also be accessible to users online. The Utilities Catalogue is the first to be obtainable through the DOCUMENT facility. The Access, Numerical Products, Storage, and Text Products Catalogues will each be put online at the time of its next update.
2. It has been policy that Catalogues are updated only on an annual basis. This was because some Catalogues had features impossible to produce on a line printer. Hence, the Catalogues had to be printed outside, and in relatively large numbers to keep printing costs down. Updating such documents more than once a year was impractical and expensive. Since printing can now be done on the 8700 laser printer, all of the Catalogues can be printed in-house, in small numbers, and can thus be updated as required.

The UTCS Catalogue: IBM MVS Utilities does have one special feature that complicates printing it through the DOCUMENT facility. Part of the Catalogue is a Product-Function List, which immediately precedes the Product Abstracts. The List is not essential to using the Catalogue, but it does provide a list of functions that can be done by utilities and recommends a utility for each. The Product-Function List was

continued...

Documentation continued

produced separately from the rest of the Catalogue and has to be printed with a landscape orientation. Consequently, the Catalogue and the Product-Function List have separate MANUAL codes (MVSUTIL for the Catalogue, UTILLIST for the List). If you want a copy of the complete Catalogue, you must request the List as if it were a separate manual and then insert it between the Introduction and the first Product Abstract. The recommended FORMS code for the List is BXQD.

Martha Parrott

PACX 2000 Installation

UTCS has embarked on a test program in conjuction with Gandalf Data Ltd. to finalize the development of the PACX 2000. This product, a data Private Branch Exchange (PBX), is the newest Gandalf offering to the marketplace. The architecture of this system permits it to provide Local Area and Wide Area Networking needs with high capacity and cost effectiveness.

A principle reason for Gandalf's selection of the University is our initiative in the use of fibre optic facilities to provide data communications services. These facilities currently extend from the Sidney Smith Building to the Engineering Annex via the McLennan Physics Machine Room. Plans have been presented to extend these fibre facilities north from Sidney Smith and east from the Engineering Annex.

The PACX 2000 is designed in concert with established standards of the common carrier telecommunications industry. As such, it makes maximal use of fibre optic technology to provide highband width connections between subscribers.

UTCS has successfully completed initial testing during the past two weeks; over the next month extensive use of the system will be made by internal staff. Subsequent to the successful conclusion of these activities, the PACX 2000 will be phased into full production. This product will be a key component in UTCS' providing increased capability communications to the University as more computing is performed by departmental facilities.

Norman Housley

ACRITH Trial Period

Last fall, IBM announced a new subroutine library called ACRITH, for use with VS FORTRAN. ACRITH is the High Accuracy Arithmetic Subroutine Library for solving problems of numerical analysis with high accuracy.

All computers have fixed length registers and storage cells, and after several million arithmetic operations, the accumulation of round off errors can yield results that may be very precise, but are very inaccurate. Since some operations (such as +-*/, cos, sqrt) do not keep track of round off error, no upper and lower bound is known for the accuracy of the final solution.

ACRITH uses a new internal arithmetic based on the four basic arithmetic functions and the scalar (dot) product. Each of these five operations is provided with four options for rounding: upwards, downwards, to the nearest number, and towards zero. It is a key feature of the new arithmetic that upper and lower bounds are kept for all operations and that careful rounding technique is chosen at each step so that the exact result lies within these calculated

continued...

ACRITH Trial Period continued

bounds. (Since ACRITH is adept at handling bounds, data can also be input with specified tolerances.)

The scalar product is implemented using an architected accumulator sufficiently long (328 hex digits) to satisfy the requirement for maximum accuracy (even for underflow and overflow conditions). The contents of two accumulators can also be added and subtracted, thus providing for two numeric functions in an internal machine format of 328 hex digits, for a hex exponent range of -128 to +127.

ACRITH also has an interactive feature available under TSO or CMS. Through a menu format, ACRITH allows the user to describe the nature of the problem and can then assist in selecting an appropriate subroutine. Once the subroutine is chosen, the data can be run through it interactively; no programs need be coded.

If IBM's claim that ACRITH provides accurate computed bounds for solutions of mathematical problems is borne out, this library may prove to be a useful tool for users of VS FORTRAN at UTCS. In order to test it, we have arranged with IBM for a 30 day trial of ACRITH on the MVS (TSO, WYLBUR, and GPJS) Operating System. During this time, the SNAC (Statistical and Numerical Analysis Computing) Group will be evaluating ACRITH. One of the concerns they will be looking at are the reports that it is 7 to 15 times slower than conventional numerical packages and might cost more to run.

Anyone interested in seeing demonstrations of ACRITH during the trial period should contact Bill Fehlner at 978-6509. If you are unsure which numerical package is best suited for your application, an appointment can be made for you with the SNAC Group, at 978-STAT.

Paul Shindman

ISSUE Regional Meeting in Toronto

As was announced in the last issue of *COMPUTERNEWS,* the International SPSS Software User's Exchange (ISSUE) will hold a regional meeting in Toronto on April 15-16. Over 40 people have responded to the preliminary survey so far, and more inquiries are expected as the word spreads. A tentative schedule has been arranged as follows:

DATE	TIME	LOCATION	TOPIC
Monday	12:30-2:30	Queen's Park	Features of SPSS-X Release 2.1
	3:00-5:00	Queen's Park	SPSS/PC
	5:30-6:30	Chelsea Inn	Reception
	6:30	Chelsea Inn	Dinner
Tuesday	9:00-10:30	Ryerson	a) Converting from SPSS 9.1 and Promoting SPSS-X b) Paper Session
	11:00-12:30	Ryerson	a) Hints and Tricks for SPSS-X Users b) Paper Session (Repeat)
	1:00	Ryerson	Lunch

In addition to the sessions on Tuesday, a room with micros running SPSS/PC will be available for use from 9:00 a.m. to 5:00 p.m. The organizing committee is still looking for people who would like to present short papers on a variety of topics, such as "My Experiences with SPSS/PC," or "Using LISREL in My Favourite Study." The cost of the conference is $45.00, which includes the reception, dinner and lunch as well as conference materials. The deadline for registration is April 1.

For further information, call Tim Daciuk, Ryerson Polytechnical Institute, at 979-5000 ext. 6833.

Diane Mitchell

Microcomputer Support Group

We would like to announce some changes in our support structure for **KERMIT:**

- Supported versions of **KERMIT** are now being distributed through the Information Office at about the price of a diskette. KERMIT is available for the IBM PC or PC/XT, and for the APPLE II with Super Serial Card.
- Help for KERMIT problems is available through Advising Services, at **978-HELP,** between 10:00 a.m. and 6:00 p.m. on weekdays.

The **telephones** in the Micro Support Group will be undergoing some changes shortly. This is happening in response to callers who have had difficulty reaching us because we are often working with users in the Micro Lab. Instead of the two or three numbers previously published for the members of the group, there will now be **one** number to call for micro support: 978-8701. It will be answered in the Central Advising Office, which will be connected to the Micro Lab. This way we can still be reached quickly if necessary.

We hope users will find these new arrangements satisfactory.

Paul Roth

Humanities News - COGS Update

The COGS User's Manual has been updated to include the current Version 3.1 features of COGS. It is now about twice as long as the previous edition and can be purchased at the Information Office, in the Engineering Annex, Room 206.

The Table of Contents includes: Concordances and Text Comparison (Types of Concordances, Applications of Concordances, and Steps in Concording); System Overview (Basic Facilities and Concepts); a COGS Tutorial; COGS Command Syntax; Listing Formats and Messages; JCL for COGS; and COGS Character Processing.

As a result of the updated manual, all COGS catalogued procedures will be updated to refer to Version 3.1 as of March 4, 1985. If you experience any problems with the new version, please contact me at 978-5130.

Additional program development work on COGS is underway. New features to be added include: more "rudimentary" statistics involving type/token counts, more control over formatting, and the integration of COGS' internal files with other packages, mainly SAS.

Lidio Presutti

VS FORTRAN Release 4.0 To Become Available

UTCS will shortly be upgrading the procedures FORN, FORNLE, FORNLEGO, etc., to access the new IBM VS FORTRAN Release 4.0 compiler. This compiler has several significant enhancements that should interest FORTRAN users. Among the major items are:

1. Library routines are loaded at execution time. This allows for both the creation of smaller load modules (with a saving in disk space) and the speeding up of the execution time load module.
2. The Automatic Precision Increase feature allows users to selectively increase the precision of floating point items without recoding. Single precision can be made double, double can be made extended, merely by recompiling with the AUTODBL option.
3. Faster character handling.
4. Improved I/O support. For sequential, unformatted I/O, all record formats are available, i.e., fixed, fixed block, undefined, variable, and variable spanned. Users dealing with undefined records will no longer have to use the UTCS RDBLCK and WRTBLK routines. There are other significant extensions to I/O support as well. Users are urged to watch the UTCS online documentation services for further details.

Herb Kugel

Hours of Service

The following hours of service will be in effect for **Good Friday** and **Easter Sunday.**

	April 5 (Friday)	**April 6 (Saturday)**	**April 7 (Sunday)**
IBM 3033/N12 GPJS (Classes B,E, Calcomp)	closed	10:00-18:00	10:00-1800
IBM 3033/N12 GPJS (Class A, WYLBUR, APL, TSO)	unattended	10:00-18:00*	10:00-18:00*
DECsystem-10, GP UNIX	unattended	10:00-18:00*	10:00-18:00*
BICS	unattended	unattended	unattended

** Running unattended outside these hours.

Normal hours of service for all systems will resume on **Monday, April 8, 1985.**

UTCS Noncredit Short Courses

UTCS offers a number of short, noncredit courses on the use of various products and services that we support. These courses are available to students, faculty and staff of the University of Toronto, as well as to other users of our systems. Complete course descriptions for these and other noncredit courses offered at UTCS are available at the Information Office, Engineering Annex, Room 206, and at the Accounting Services Office, McLennan Labs, Room 337.

All short courses are held in the UTCS Education Facility, Room 221, McLennan Physical Laboratories. Due to the limited seating capacity in the Education Facility, and the number of terminals available for our hands-on courses, registration is required for short courses.

Please note that we reserve the right to cancel courses, if registration is too low.

Anyone interested in taking any of these courses must register in person with:

Educational Coordinator
Engineering Annex, Room 207
978-4565

A nonrefundable Administration Fee of $10 per course is due at the time of registration. It may be paid by cash, cheque or on a Customer Account Number (CAN).

(Anyone interested in credit courses should contact the Dept. of Computer Science at 978-6360).

The following courses are offered in March:

JCL101 - Introductory JCL

Date: March 18-22, 1985
Time: 10:00-11:00 a.m.

TXT/UNIX101 - ed and SCRIBE on GP UNIX

Date: March 25 - April 3, 1985
Time: 9:30-11:30 p.m.

Irene Rosiecki

Personnel Changes

Arny Sokoloff, with UTCS since 1981, has been promoted to Supervisor of Hardware and Communications. Congratulations!

Elizabeth Weitmann

Change Committee

Changes to the IBM 3033/N12 Machine

1. The LEVEL keyword was removed from the FORTRAN and COBOL procs on January 3.
2. FORTRAN Release 3.1 and COBOL Release 2.4 were installed for production on January 3.
3. ANSI 3 COBOL and PL/I Release 3 were removed from the system on January 3.

Changes To TSO/WYLBUR

1. Journalling was added to the REG/SCR command on December 14, 1984. This change was completed

continued...

Change Committee continued

in preparation for a change to the SCRATCH documentation and code on TSO, WYLBUR, and GPJS, which took place on January 3.

2. The RENAME command on WYLBUR was suspended on January 15 because of a serious problem in the vendor code.

Changes to Other Systems and Services

1. Changes to parameters of the modem control signal on the Network Terminal Servers (NTS10) were made on January 2 to improve user interface.
2. The CMS port on the NTS10 has been renamed "Research Access" or "RA". "CMS" is still available as an alias.
3. A timeout limit of 61 minutes was established for the NTS10/Series 1 ports on January 16 and should improve accessibility.
4. A prototype of a PRINT/FILE SERVER was implemented on January 16. This will provide external communication facilities to a number of standalone PCs currently used by DCS via the VAX.
5. The paper tape read/punch service was discontinued as of January 30.

Joan Coutts

New UTCS Documents

To print online documents on
IBM
WYLBUR users type "do document"
TSO users type "help document"
APL users type ")LOAD 1 UTCSGUIDE<CR>HELP"
DECsystem-10
use iprint or SOS/R command
GP UNIX
use ipr or cat command

Recommended forms code for the 8700 is YXLE unless otherwise noted.

New UTCS Documents in hardcopy

UTCS Catalogue: IBM MVS Utilities

Previously announced:

UTCS GUIDE TO PRODUCTS AND SERVICES: Introduction
UTCS GUIDE TO PRODUCTS AND SERVICES: Basics
UTCS GUIDE TO PRODUCTS AND SERVICES: Accounting
UTCS Catalogue: Access, Part 1
UTCS Catalogue: Access, Part 2
UTCS Catalogue: Numerical Products
UTCS Catalogue: Storage
UTCS Catalogue: Text Products
UTCS Guide to Census Tapes
UTCS Guide to File Transfer Service
UTCS Guide to GP UNIX
UTCS Guide to Highspeed Printing
UTCS Guide to KERMIT
UTCS Guide to Mainframe File Transfer Facility
UTCS Guide to SCRIBE
UTCS Guide to Text Processing on GP UNIX
The SOS Workbook

New UTCS Guides online

UTCS Catalogue: IBM MVS Utilities
IBM: MANUAL=MVSUTIL
Product-Function List
IBM: MANUAL:UTILLIST
Recommended forms code is BXQD.
UTCS Guide to SUBUTILS
IBM: MANUAL=SUBUTILS
UTCS Guide to UTDSUTIL
IBM: MANUAL=UTDSUTIL
Recommended forms code is YXJE.

Previously announced:

UTCS GUIDE TO PRODUCTS AND SERVICES: Basics
IBM: MANUAL=BASICS
DEC: DOC:BASICS.DOC
GP UNIX: /usr/doc/utcs/basics
UTCS Guide to APL
IBM: MANUAL=APLGD
UTCS Guide to APL XFR
IBM: MANUAL=APLXFR
UTCS Guide to Census Tapes
IBM: MANUAL=CENSUS
DEC: DOC:CENSUS.DOC
GP UNIX: /usr/doc/utcs/census
UTCS Guide to File Transfer Service
IBM: MANUAL=FTS
DEC: DOC:FTS.DOC
UTCS Guide to GPJS
IBM: MANUAL=GPJSX
DEC: DOC:GPJS.DOC
GP UNIX: /usr/doc/utcs/gpjs
UTCS Guide to Highspeed Printing
IBM: MANUAL=PRINT
DEC: DOC:PRINT.DOC
GP UNIX: /usr/doc/utcs/print
UTCS Guide to IBM MVS Online Storage
IBM: MANUAL=IBMDISK
UTCS Guide to KERMIT
IBM: MANUAL=KERMIT
DEC: DOC:KERMIT.DOC
GP UNIX: /usr/doc/utcs/kermit
UTCS Guide to Mainframe File Transfer Facility
IBM: MANUAL=MFTF
UTCS Guide to SCRIBE
DEC: DOC:SCRIBE.DOC
(For printing instructions, see page 1 of document.)
UTCS Guide to Series/1 Terminal Use
IBM: MANUAL=SERIES
3270 Emulation:
UTCS Guide to
Cybernex APL100 and Volker Craig VC404 (MANUAL=CYBER)
DM1520 (MANUAL=DM1520)
Hardcopy Terminal (MANUAL=HARDCOPY)
IBM 3101 (MANUAL=IBM3101)
SOROC IQ (MANUAL=SOROC)
VT52 (MANUAL=VT52)
VT100 (MANUAL=VT100)
UTCS Guide to Text Processing on GP UNIX
GP UNIX: /usr/doc/utcs/text
Recommended forms code is YXJE.
UTCS Guide to TFW.MAK in SCRIBE
DEC: DOC:TFW.DOC
UTCS Guide to TSO (Draft)
IBM: MANUAL=TSOGD
UTCS Guide to WYLBUR
IBM: MANUAL=WYLINTRO
UTCS WYLBUR Tutorial
IBM: MANUAL=WYLTUTOR
The SOS Workbook
DEC: DOC:SOSWRK.DOC

Recent Acquisitions in the Computer Library

Campbell, J.A., ed.
Implementations of PROLOG.
Chichester, Eng., Ellis Horwood, 1984.

Canadian Society for Computational Studies of Intelligence.
Proceedings. 1984, the 5th.

Clark, Keith L. and McCabe. F.G.
Micro-PROLOG: programming in logic.
Englewood Cliffs, N.J., Prentice-Hall, 1984.

Electronics buyers' quide, 1984/85.
New York, McGraw-Hill, 1984

Elsevier Science Pub. Co.
The software catalog: microcomputers (Winter 1985)
New York, Elsevier, 1985.

Finnish Artificial Intelligence Symposium, Espoo, Aug. 1984.
STeP-84 Symposium papers, ed. by E. Hyvönen et al.
Finnish Society of Information Processing Science, 1984.

Frey, Peter William, ed.
Chess skill in man and machine. 2d ed.
New York, Springer-Verlag, 1983.

Hayes, Jeremiah F.
Modeling and analysis of computer communications networks.
New York, Plenum Press, 1984.

IFIP TC 2 Working Conference on PDE Software, Soderköping, Sweden, Aug. 1983.
PDE software: modules, interfaces and systems, ed. by B. Engquist and T. Smedsaas.
Amsterdam, North-Holland, 1984.

Kfoury, A.J. et al.
A programming approach to computability.
New York, Springer-Verlag, 1982.

MacKay, Robert et al.
University of Toronto M6809 microprocessor laboratory: notes and experiments (version 1.1)
Toronto, University, Dept. of Electrical Engineering, 1982.

Stephanie Johnston

Technical Reports Recently Received in the Computer Library

Stanford University, Dept. of Computer Science

Gabriel, R.P. and McCarthy, J.	Queue-based Multi-processing Lisp.
Lazowska, E.D. et al.	File access performance of diskless workstations.
Sagiv, Y. and Ullman, J.D.	Complexity of a top-down capture rule.

Newcastle upon Tyne, University

Linton, A. and Panzieri, F.	A communication system supporting large datagrams on a local area network.
Panzieri, F.	Communications protocols for local area networks.
Anyanwu, J.A.	A reliable stable storage system for UNIX.
Randell, B.	The Newcastle Connection: a software subsystem for constructing distributed UNIX systems.

Stephanie Johnston

Consulting and Enquiries

Advising Supervisor	Terry Jones	MP345	4757
External Marketing Consultant	Ihor Prociuk	MP350	6875
Erindale College	Peter Wall	2035	828-5311
Scarborough College	William Barek	S626	284-3173

General Enquiries	Dale Wright	EA206	4990
Account & Access Code Enquiries (U of T)	Agatha Stevens	MP337	8703
Account & Access Code Enquiries (External)	Sylvia May	MP337	7148
Tape Library (Academic Services)	Stella Martin	MP368	7319
Tape Library (Administrative Services)	Miranda Fong	MP368	6693
U of T Computer Library	Stephanie Johnston	EA206	2987

Central Advising Office (Appointments)	HELP
Central Advising Office (Phone-in)	HELP
Microcomputer Support Group	8701
Numerical/Statistical Advising	STAT
System Status Enquiries (DEC)	4318
System Status Enquiries (IBM)	7393

300 Baud Interactive Services	6200
1200 Baud Interactive Services	3959
DATAPAC	4320, 0056
Telenet	0302043200056
Tymnet	<backspace> DPAC;302043200056

UTCS Directory

Director	Dr. Warren Jackson	MP350	8948
Associate Director	Eugene Siciunas	MP350	5058
Budget Analysis Supervisor	Marg Doherty	MP350	8697

Managers

Communications & Technical Support	Norman Housley	SF4306	4967
Internal Systems & Administration	Ron Vander Kraats	MP350	4428
Operations	Dr. Bob Chambers	MP350	7092
Systems	Bill Lauriston	MP331	3579
User Interface	Don Gibson	MP350	7331

Committees on Computing

UTCS Board	Chairman	Prof. D.M. Nowlan	4984
Committee on Academic Computing	Chairman	Prof. J.Z. Buchwald	7391
Committee on Computer Networks & Telecommunications	Chairman	Mr. A. Heyworth	4936
Committee on Computing Facilities & Services	Chairman	Prof. J.D. Bossons	8626
Natural Language Processing Steering Committee	Chairman	Prof. I. Lancashire	828-5273
UTCS Users' Committee	Chairman	Prof. J.C. Hurd	3056
	Secretary	Ms. C. Pereira	4463

UTCS Terminal and Advising Sites

Names and Locations

- **Central Advising Office (CAO), 978-HELP**
- **Education Facility (Educ)**, McLennan Labs, 60 St. George St., Room 221
- **Engineering Annex (EAT, EUT, CDF)**, 11 King's College Road, Rooms 103, 104, 107, 107B, 201, 203.
- **Erindale College (Erin), 828-5339**, Mississauga Road, Erindale Campus, Rooms 2005, 2039, 2045
- **Robarts**, Robarts Library, 130 St. George St., Room 1061A
- **Scarborough College (Scar), 284-3122**, Military Trail, Scarborough Campus, Rooms S624, S625, S627, S628, S628A
- **Sidney Smith (AST & ASUT)**, 100 St. George St., Rooms 1071, 1073, 2104, 2105
- **St.Michael's College**, 121 St. Joseph St., Room 101
- **Trinity College**, 6 Hoskins Ave., Room 024
- **Victoria University**, 73 Queens Park Cres., Room 005.

Sites	**Hours of Operation**				**Restrictions***	**Advising**
	Mon-Thurs	Fri	Sat	Sun		
AST	8:00-22:00	8:00-22:00	8:00-22:00	8:00-22:00	Research	978-HELP
ASUT	7:00-24:00	7:00-24:00	7:00-24:00	7:00-24:00	BICS	Arranged by Dept.
CAO	10:00-18:00	10:00-18:00	closed	closed	Research	978-HELP
CDF	24 hrs	24 hrs	24 hrs	24 hrs	Under	No
EAT	24 hrs	24 hrs	24 hrs	24 hrs	Research	Rm 106
Educ	24 hrs†	24 hrs†	24 hrs†	24 hrs†	Research**	978-HELP
(outer)	24 hrs†	24 hrs†	24 hrs†	24 hrs†	Research	978-HELP
Erin (2039)	9:00-17:00	9:00-17:00	24 hrs	24 hrs	Research	Rm 2005
(2045)	24 hrs	9:00-17:00	24 hrs	24 hrs	Undergrads	Rm 2005
EUT	24 hrs	24 hrs	24 hrs	24 hrs	BICS	Rm 107B
Robarts	8:30-24:00	8:30-24:00	9:00-17:00	13:00-22:00	BICS, Micros	Arranged by Dept.
Scar	9:00-24:00	9:00-24:00	10:00-17:00	closed	Research	Rm S624, S626
					Undergrads	Rm S624
St.Michael's	24 hrs	24 hrs	24 hrs	24 hrs	None	Arranged by College
Trinity	8:00-22:00	8:00-22:00	8:00-22:00	8:00-22:00	None	Arranged by College
Victoria	8:30-23:00	8:30-23:00	closed	closed	None	Arranged by College

* Research includes graduates, faculty, staff. ** May be unavailable due to UTCS courses.
† Building open Mon. - Thurs. 7:00 - 22:00, Fri. 7:00 - 17:00. Building closed Sat. & Sun.

Advising Hours

CAO	Monday through Friday, 10:00 - 18:00
EAT	Monday through Friday, 13:00 - 17:00 (Oct. - mid Dec., Jan. - Apr.)
Scar	Monday through Friday, 09:00 - 17:00
Erin	Mon. 09:00-17:00, Tues.-Thurs. 09:00-20:00, Fri. 09:00-17:00, Sat.-Sun. 12:00-16:00.

Services Available
(Y=yes, N=no)

	BICS	**Keypunch**	**PACX**	**Printers**	**Network Terminal Server**	**DCS Micros**
AST	N	N	N	Y	Y	N
ASUT	Y	N	N	Y	N	N
CDF	N	N	N	Y	N	N
EAT	N	Y	N	Y	N	
Educ	N	N	Y	N	N	N
Erin	N	N	Y	Y	N	N
EUT	Y	N	N	N	N	N
Robarts	Y	N	Y	Y	N	Y
Scar	Y	N	Y	Y	N	N
St.Michael's	Y	N	Y	Y	N	Y
Trinity	Y	N	N	Y	N	N
Victoria	Y	N	Y	Y	N	N

UTCS and Managed Systems

UTCS Systems

3033/N12 Processor

- located in McLennan Physical Laboratories
- provides General Purpose Job Stream, TSO, WYLBUR, APL
- 12 megabytes of memory
- MVS with JES2

3033/U16 Processor

- located in McLennan Physical Laboratories
- provides instructional access using BICS
- 16 megabytes of memory
- UTS (modified UNIX Seventh Edition) under VM/370

DECsystem-10 Model 1090

- located in McLennan Physical Laboratories
- provides General Purpose Time-Sharing
- 512 K - 36 bit words of memory
- TOPS-10 operating system, version 7.02
- GALAXY queuing, spooling, and Batch subsystem, Version 4.1

"Hub VAX" (11/750)

- located in McLennan Physical Laboratories
- VMS
- acts as a communications gateway between UNIX, VMS, and MVS operating environments
- 4 megabytes of memory

GP UNIX

- located in McLennan Physical Laboratories
- provides General Purpose Timesharing using UNIX
- typesetting hardware (CAT/8), and (Varian) for previewing output

Communications & Technical Support

- located in Sandford Fleming Building, Fourth Floor
- Communications Group provides communications systems, terminals, modems, data channels: consulting and installation.
- Field Service Group installs and maintains small computer systems on a contract basis or on a cost-per-call basis.
- provides consulting on minicomputers; configures and installs minicomputer systems

Microcomputer Facility

- located in McLennan Physical Laboratories
- provides consulting on microcomputer systems
- offers media conversion services
- Machines include:
  IBM Personal Computer, PC/XT & PC Jr., APPLE IIe,
  Macintosh, S-100 CP/M System,
  Osborne 1, Eagle Spirit,
  plus a variety of others on loan from suppliers

Facilities UTCS Manages & Operates

4341 Mod II Processor

- located in McLennan Physical Laboratories
- provides administrative IMS/VS, DB/DC, Batch and TSO
- 16 megabytes of memory
- MVS with JES2

PDP-11/70 SAS UNIX

- located in McLennan Physical Laboratories
- provides UNIX Statistical Analysis Service (Dept. of Statistics only)
- 4 megabytes of memory
- UNIX Seventh Edition

Computer Disciplines Facility

VAX-11/750 (4 megabytes of memory)
VAX-11/750 (2 megabytes of memory)
VAX-11/780 (4 megabytes of memory)

- located in Engineering Annex
- provide Computer Science interactive access
- UNIX (Berkeley Unix 4.2BSD)

Scarborough College Systems

VAX-11/750 (5 megabytes of memory)
VAX-11/750 (2 megabytes of memory)

- provides instructional access using UNIX (Berkeley Unix 4.2BSD)

Erindale College Systems

VAX-11/780 (4 megabytes of memory)

- provides instructional access using VMS
- Research access

VAX-11/750 (5 megabytes of memory)

- provides instructional access using UNIX (Berkeley Unix 4.2BSD)

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